A STEM-Capable Workforce:

Potential Impact of SCOTUS Ruling

NACME

NATIONAL ACTION COUNCIL FOR
MINORITIES IN ENGINEERING

The National Action Council
for Minorities in Engineering (NACME)

The National Action Council for Minorities in Engineering (NACME) was established in 1974 by a group of concerned business leaders to develop and catalyze a suite of strategies to increase the participation of individuals from populations that have been historically underrepresented in engineering, specifically Black/African American individuals, Hispanic or Latino/a individuals, and Native American individuals (sometimes grouped together as "underrepresented minorities" or "URMs"). In recent years, NACME has also expanded to include a focus on broadening participation in computing. Despite some strides, the challenge of diversifying the engineering profession remains–and has not kept up with the nation's demographic reality.

Talent is the treasure on which America's science and engineering (S&E) enterprise–and the nation's prosperity, health, and security depend. To remain globally competitive, the US must be a STEM talent powerhouse that uses a two-pronged strategy of expanding domestic talent while continuing to attract and retain global talent. A growing number of jobs critical to national security, in such areas as cybersecurity and defense-related technologies, require both S&E skills and US citizenship. A diverse talent pool of STEM-literate Americans prepared for the jobs of the future will be essential for maintaining the national innovation base that supports key sectors of the economy and for making the scientific discoveries and creating the technologies of the future. [1]

The Opportunity at Hand

For generations, American science and technology leadership has driven extraordinary change and has become part of the fabric of life. Modern experiences are defined by breakthroughs forged by American innovation: the semiconductor that powers everything from our cars to our phones, the GPS that gets us from one place to the next, the medicines and vaccines that keep us safe and protect the lives of the people we love. Over time, these efforts have transformed society and bolstered the world's most dynamic economy.

The United States has championed new transformative investments in innovation: The Bipartisan Infrastructure Law, the CHIPS and Science Act, and the Inflation Reduction Act seek to make life better, safer, and more prosperous. Through the reignited Cancer Moonshot and the Executive Order on Biotechnology and Biomanufacturing Innovation, the Biden-Harris Administration is leading historic efforts to deliver better health outcomes and greater economic opportunity for all communities.

Despite this track record of national leadership, these investments in science and technology rarely translate to equitable results for all people and communities without sustained, intentional effort. Indeed, such advances have often served to deepen inequality and reinforce systemic barriers, with the benefits of science and technology not reaching all communities equally. As an example, we can look at the growth in engineering degrees granted to US citizens prompted by our race to the moon in the wake of Sputnik's launch by the USSR in 1957. Concerns about being surpassed in the race for innovation through research and development ignited a concerted effort to groom more engineers by increasing the number of engineering programs and majors, as well as by supporting other institutions that prepare students for work in the field. Subsequently, scholars and legislators emphasized the role of science and

1 Subcommittee on Federal Coordination in STEM Education, Charting A Course for Success: America's Strategy for STEM Education (Washington: NSTC, 2018), v.

engineering in learning at all levels of education. Yet, the geopolitical imperatives of competition between great powers did not produce specific policy directives geared toward achieving equity, equality, or a goal for representation in specific fields during this early period.

The response engendered by the publication of *A Nation at Risk*[2] – a landmark study by the United States National Commission on education published in 1983–enhanced the scientific and technical workforce, but these gains were not broad-based. Racial and gender bias has contributed to low enrollment, persistence, and completion rates for women and racial and ethnic minorities in engineering and many other technical and scientific majors. A misallocation of resources among the pool of underrepresented minorities and women has resulted in lost productivity for the nation since the 1960s. Researchers have found that the modest improvements in diversity and employment opportunities for women and Black/African American men since the 1960s has resulted in a 20–40 percent increase in aggregate economic output, but that remains well below the potential increase if talent were distributed more equally across highly-skilled occupations such as engineering.[3]

The US higher education system has made tremendous strides in educating the engineering workforce. In the 1970–71 academic year, US colleges conferred just 45,000 engineering bachelor's degrees. Almost 50 years later, that production had more than doubled: 122,000 engineering bachelor's degrees were conferred in the 2017–18 academic year.[4] This growth rate is almost twice as fast as that of the labor force for the comparable period. Measurable progress with diversity during this period does nothing to obscure the considerable work that remains. Despite comprising over one-third of the nation's population, Black, Indigenous, and Latino/a individuals are significantly underrepresented within engineering and computer science professions–and, therefore, miss the higher earnings associated with these professions. (See figure 1.0)

What is a selective public college?
What is an open-access public college?

Selective colleges comprise the 530 most selective colleges in the United States. The median SAT scores of students admitted to these colleges range between 1150 and 1600. About 170 of these institutions are public, including the University of California, Berkeley; the University of Michigan; and the University of Texas at Austin.

Middle-tier colleges comprise 830 institutions that are less selective than the top tier–but still deny entrance to a sizable number of students. The median SAT scores of students admitted to these colleges range from below 1000 to 1140. About 340 of these institutions are public, including Arizona State University, all the California State University campuses, and Kutztown University of Pennsylvania.

Open-access colleges comprise 3,100 two- and four-year colleges that admit students who demonstrate evidence of high school graduation or its equivalent. About 1,100 of these institutions are public, including the University of Arkansas at Little Rock, the University of Nebraska at Kearny, and Eastern Oregon University, as well as community colleges like Miami-Dade College and Northern

2 National Commission on Excellence in Education. "A Nation at Risk: The Imperative for Educational Reform." Washington, DC: US Department of Education, 1983.

3 Hsieh et al., "The Allocation of Talent and U.S. Economic Growth," 2019.

4 Georgetown University Center on Education and the Workforce analysis of data from Table 322.10 of the Digest of Education Statistics, 2019.
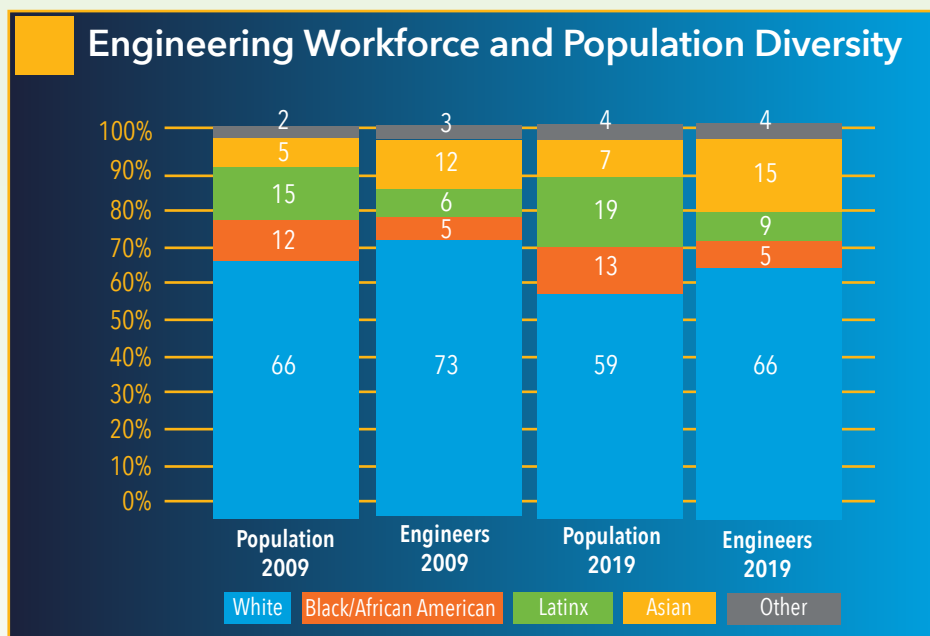
Engineering Workforce and Population Diversity

	Population 2009	Engineers 2009	Population 2019	Engineers 2019
Other	2	3	4	4
Asian	5	12	7	15
Latinx	15	6	19	9
Black/African American	12	5	13	5
White	66	73	59	66

White · Black/African American · Latinx · Asian · Other

Figure 1 *Population and Engineering Workforce Diversity Over a Ten Year Period*

Enrollment Trends and Graduation Rates

Given that the rising cost of college affects underrepresented students disproportionately through diminished enrollment, American higher education faces a heightened challenge to its diversity goals. Black, Indigenous and Latino/a students – particularly those who come from low-income or single parent households and/or are first-generation college students – face multiple challenges to college entry and success. These include economic challenges, low persistence rates, bias, lack of role models and lack of representation, institutional racism, and recent anti Diversity Equity, and Inclusion (DEI) legislation. By improving graduation rates, all types of institutions can be minority-serving. Research shows that two factors explain why some students take longer to graduate or complete their college education: students' lack of academic preparation and colleges' lack of financial aid and other student services that support degree completion. Insufficient financial resources and inadequate support services are the primary factor in noncompletion.[5] Selective colleges have more resources, and, partly – as a result – higher graduation rates. [6]

Although some institutions are moving to more holistic admissions practices, test scores are used to sort applicants and sometimes serve as impediments for under-represented students. Test score range is one of the descriptors used in differentiating selective public colleges from open-access public colleges.[7] According to the Georgetown University Center on Education and the Workforce, there are more than enough Black/African American and Latino/a students who score above average on standardized tests to fill the requisite seats to secure equal representation by race and ethnicity at selective public colleges and universities. While enrollment disparities continue, the divide between the selective public colleges and open-access public colleges is getting wider and will likely become more problematic because of the Supreme Court's ruling against affirmative action in college admissions.

5 Bound et al., "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources," 2009.

6 TThe graduation rates for selective and open-access colleges are 85 percent and 51 percent, respectively. These rates were calculated using the Education Longitudinal Study of 2002.

7 Georgetown University Center on Education and the Workforce, Our Separate & Unequal Public Colleges: How Public Colleges Reinforce White Racial Privilege and Marginalize Black and Latino Students, 2018

When given a chance to attend highly selective colleges, Black/African American and Latino/a students graduate from selective colleges at almost the same rate (81 percent) as White students (86 percent). In comparison, the Black and Latino graduation rate from open-access colleges is only 46 percent (figure 2).[8] In general, open-access schools (both four-year and two-year) have far fewer resources, which makes offering and maintaining engineering programs less likely. Black/African American and Latino/a students are less likely than White and Asian students to attend a college that has an engineering bachelor's degree program. During the 2018-19 academic year, 37 percent of White students were enrolled in a college that had an engineering bachelor's degree program. This was the case for only 24 percent of Black/African American students, and 28 percent of Latino/a students.[9] This lack of access to engineering programs for Black/African American and Latino/a students may constitute a form of systemic discrimination. While the graduation rates for open access institutions are much lower, they are the professional lifeline for many due to limited opportunities to attend more selective institutions. Efforts to broaden participation in engineering require a multi-pronged approach that challenges selective institutions to adopt more inclusive admission practices–and provides funding and resources to support degree attainment for under-resourced open access colleges where many Black/African American, Latino/a, and Native American students are enrolled.
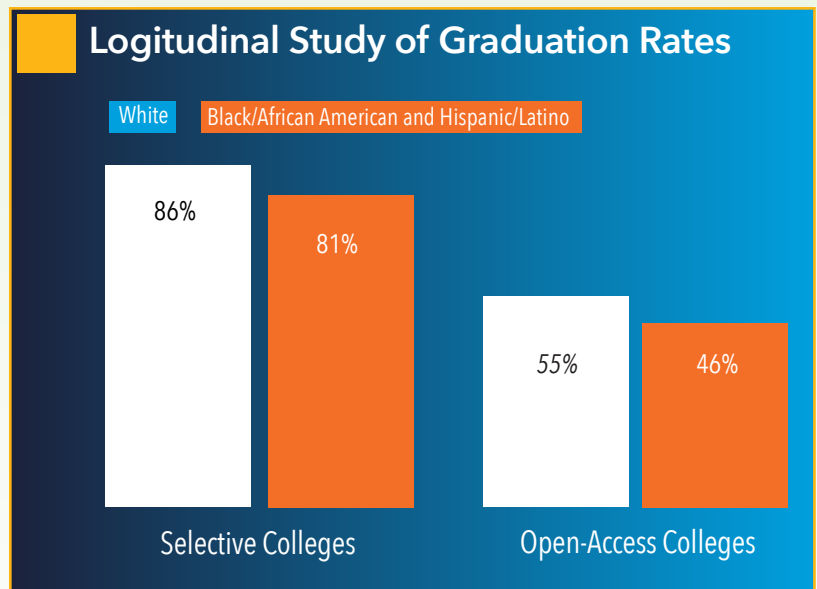

Figure 2 *Longitudinal Study of Graduation Rates and Selective and Open Access Colleges*

Potential Impact of Legislation

The Supreme Court of the United States (SCOTUS) ruling on race-based college admissions policies may affect millions of students in the United States. Currently, many universities consider race as a factor in their admissions decisions to pro-mote diversity and equal opportunities for all students. However, opponents argue that these policies are discriminatory and violate the principle of meritocracy.

Those who support race-based admissions policies argue that they are necessary to address historical and ongoing dis-crimination against certain minority groups, such as African Americans and Latinos. They argue that without such policies,

these groups would be underrepresented in higher education, perpetuating social and economic inequalities. Further-more, proponents argue that diversity in higher education is beneficial for all students, as it exposes them to different perspectives and prepares them for a diverse workforce.

On the other hand, opponents of race-based admissions policies argue that they are inherently discriminatory–as they favor certain racial groups over others. They argue that admissions decisions should be based on merit alone, and that

8 Georgetown University Center on Education and the Workforce analysis of data from the National Center for Education Statistics, Education Longitudinal Study of 2002, 2012.
9 Georgetown University Center on Education and the Workforce analysis of data from the Integrated Postsecondary Data System (IPEDS), 2018–19.

race should not be a factor. Furthermore, opponents argue that race-based admissions policies can create a stigma around minority students, as they may be seen as having been admitted based on their race rather than their qualifications.

Given that the Supreme Court of the United States has ruled to eliminate race-based admissions consideration, it will be important for industries to step-up and take action to ensure diversity in fields like engineering. While some will certainly think the ruling was made with good intentions, it will have unintended consequences that will impact the progress of diversity in the workforce adversely, particularly in those fields where specific groups have been under-represented historically. The dearth of participation by women, Black, Indigenous, and Latino/a Americans may impoverish American innovation and creativity—and diminish American industry's depth of understanding about the needs of diverse communities. It is, therefore, crucial that industries take steps to ensure that diversity is not only maintained but enhanced.

One way that industries can help lessen the impact of the SCOTUS ruling is by implementing their own diversity initiatives. This could include partnering with universities and other organizations like NACME to provide scholarships and internships to underrepresented groups, as well as creating mentorship programs to help these individuals succeed in their careers. Another way that American companies can help is by creating a culture of inclusivity within their organizations. This includes providing diversity and inclusion training to employees—and creating policies that promote diversity and equity in the workplace.

Many organizations provide support and resources for students from under-represented backgrounds that help bridge the gap in opportunities and create a more inclusive workforce. It is imperative that they continue to invest in programs that provide mentorship and resources for students who may not have access to the same opportunities as their peers. By partnering with universities and community organizations, companies can help provide these resources and create a pipeline for talented students to enter the engineering field. Finally, industries can work to change the perception of engineering as a field that is only appropriate for a certain type of person. This may include creating outreach programs to schools and communities to demonstrate that engineering is a field that is open to everyone, regardless of background.

These suggestions align well with NACME's recently adopted, forward-looking strategic plan that seeks to Spark Early Interest in younger students, Create Pathways for under-represented students to attend college, Increase Scholarships (amounts & recipients), Expand Trainings to more African American, Latino/a, and Native American students, Hire More/ Ear-lier and adopt leading/inclusive hiring & training practices. The NACME Board of Directors (BOD) and university partners will continue to play an integral role in implementation of the strategic plan.

While it is important to consider the legal and ethical implications of affirmative action, it is also crucial to ensure that all students have access to the same opportunities. This will require our innovative and collective genius to help lessen the impact of the ruling and ensure that America's workforce is excellent and inclusive. **Efforts must be bold, intentional, deliberate, and proactive to ensure no groups are left behind, otherwise they are likely to remain unintentionally excluded.**

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